

Cracow University of Technology

## Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies  
in the academic year 2022/2023

### Information on the course

Name of the course in Polish	Materiały spiekane
Name of the course in English	Sintered materials
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and technology
Discipline of education	Materials engineering
Person responsible for the course Contact	Prof. Jan Kazior, doctor habilitatus jan.kazior@pk.edu.pl

### Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

\*G – graded credit, NG – non-graded credit

### Course objectives

Code	Objective description
Objective 1	Expanding knowledge on modern sintered materials used in the construction of machines and devices
Objective 2	Acquiring the ability to select the appropriate sintered, constructional, tool and special materials for applications in the engineering industry

### Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUD DS	Methods of verification
<b>OUTCOMES RELATED TO KNOWLEDGE</b>			
EUW1	The doctoral student knows and understands the basic conditions for the use of sintered materials for various applications	E_W01, E_W02	Involvement in class activities, a paper
EUW2	The doctoral student knows and understands the basic conditions of the manufacturing process and properties of sintered materials	E_W01, E_W02	Involvement in class activities, a paper
<b>OUTCOMES RELATED TO SKILLS</b>			

EUU1	The doctoral student has the skills to evaluate sintered materials in terms of their properties and structure	E_U01	A paper, a presentation
EUU2	The doctoral student has the skills to study the properties of sintered materials and to correctly analyze and evaluate the results obtained in the design of structural elements of machines and devices	E_U01	A paper, a presentation
<b>OUTCOMES RELATED TO SOCIAL COMPETENCES</b>			
EUK1	The doctoral student is aware of the choice of sintered materials based on economic and environmental factors	E_K01, E_K03	Discussion

### Course outline

No.	Contents	Learning outcomes for the course	No. of hours
<b>LECTURE</b>			
W1	Sintered iron-based construction materials	EUW1, EUW2, EUU1	2
W2	Structural sinters based on copper, aluminium, nickel and titanium	EUW1, EUW2	1
W3	Sintered stainless steels	EUW2, EUU2, EUK1	2
W4	Sintered self-lubricating bearings and bi-metal strips.	EUW1, EUW2	2
W5	Highly porous materials, sintered filters and flame barriers	EUW1, EUW2, EUU1	2
W6	Sintered electrical releasable and sliding contacts. Sintered friction materials. Sintered materials with special magnetic properties.	EUW1, EUW2	2
W7	High-melting metals and heavy sinters. Sintered tool materials (cemented carbides, sintered high-speed steels, metal-diamond materials)	EUW1, EUW2	2
W8	Sintered composite materials	EUW2, EUU2, EUK1	2

### The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
<b>SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER</b>	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	2
<b>HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER</b>	
Independent study of the course contents	8
Preparation of a paper, a report, a project, a presentation, a discussion	4
<b>ECTS POINTS STATEMENT</b>	
Total number of hours	30
The ECTS points number	1

### Preliminary requirements

No.	Requirements

1	Basic knowledge of materials engineering.
2	Knowledge of the English language.

**Course credit assignment conditions / method of the final grade calculation**

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	75% attendance in class. Presentation of a paper.
METHOD OF THE FINAL GRADE CALCULATION	
Weighted average grade for the presentation.	

**Additional information**

Not specified
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**The course reading list**

1	W. Rutkowski - <i>Projektowanie właściwości wyrobów spiekanych z proszków i włókien</i> . PWN, Warszawa 1977.
2	R. German – <i>Powder metallurgy &amp; particulate materials processing</i> . MPIF, Princeton, New Jersey 2005.
3	J.Kazior – <i>Bor w spiekanych austenitycznych stalach nierdzewnych</i> – Wyd. PK. 2004
4.	J.Kazior – <i>Analiza czynników technologicznych decydujących o właściwościach spiekanych austenitycznych stali nierdzewnych</i> – Wyd. PK 1994